HIV RISK BEHAVIORS, HIV TESTING, AND ENTRY INTO MEDICAL CARE IN UTAH

by

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ABSTRACT

Early diagnosis of HIV infection is beneficial for improved health outcomes on the individual level and for HIV prevention on the community level. Using data from a survey of men who have sex with men (MSM) and from the electronic HIV/AIDS reporting system (eHARS) at the Utah Department of Health, I explored high-risk behaviors and HIV testing among men MSM in Utah and entry into medical care for newly diagnosed individuals in Utah.

Using a survey of 986 MSM, the associations between high-risk behaviors, HIV testing, and having a regular medical care provider were examined. Sixty percent of the MSM had a regular provider and 53% had been tested for HIV in the last year. For the three sexual risk behaviors (number of partners, type of partner, and use of condoms during anal sex) there was no association with having a medical provider. However MSM who inject drugs were less likely to have a medical provider. Having an HIV test in the last year was only associated with having a regular medical care provider if the patient disclosed his sexual orientation to the provider. Based on these findings, I recommend that interventions to improve communication between a patient and his provider be developed, and if a provider is uncomfortable asking about sexual history, then the provider should universally screen for HIV.

Survival analysis was used to evaluate the time from initial HIV diagnosis to entry into medical care for 522 newly diagnosed individuals. Of these individuals, 65%

had entered medical care within the first 90 days while for 14% there was no evidence of ever entering care. The only characteristic associated with delayed entry to care was having no risk identified (NRI) for transmission. This finding suggests that individuals with NRI may benefit from more extensive post-HIV counseling.

To my parents for always believing in and supporting me,

and to Rachel, my kindred spirit, for always being by my side.

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CHAPTER 1

INTRODUCTION

The Human Immunodeficiency Virus (HIV) infects millions of people worldwide and causes an estimated two million deaths per year due to its progression to AIDS. It is estimated there are 1.2 million people living with HIV/AIDS (PLWHA) in the United States.[1] With the introduction of effective antiretroviral therapies in the mid-90s, there has been a push in the medical and public health communities for people to be tested for HIV and, if positive, to be linked into medical care. Delay in medical care can result in a weaker immune system, an increased number of co-morbidities, and a quicker progression to an AIDS diagnosis. [2, 3] Delay in care also result in higher health care costs due to increased hospitalizations and the need for immediate anti-retrovirals.[4, 5]

Of the PLWHA, a significant portion is untested and/or untreated. In the United States, an estimated one-fifth of HIV positive individuals are undiagnosed, and an estimated one-third who know of their HIV status may not be receiving appropriate medical care.[6]

In an effort to increase HIV testing, the Centers for Disease Control and Prevention released new guidelines in 2006 recommending that medical care providers make HIV testing a routine part of medical care and provide annual tests for persons who have high-risk behaviors for HIV.[7] High risk groups include injection-drug users (IDUs) and their sex partners, the sex partners of HIV-positive individuals, and men who have

sex with men (MSM) or heterosexual persons who themselves or whose sex partners have had more than one sex partner since their most recent HIV test.[7]

Purpose of the Study

Factors that contribute to HIV testing and subsequent entrance into medical care for HIV positive individuals have been well documented in previous studies. However few studies have examined these factors in a low HIV incidence context. The incidence of HIV in Utah is 5.0 new infections per 100,000 persons, compared with 29.5 new infections per 100,000 persons in New York where many of the past studies have taken place.[8] In 2009, among the 40 states with confidential name-based reporting, Utah ranked as the eighth lowest state for the lowest rate of new HIV diagnosis.[8]

This research examined the associations between high risk behaviors for transmission of HIV, having a medical care provider, and being tested for HIV. It also identified factors associated with PLWHA being out of medical care and length of time to enter care. Based on the research findings, possible interventions to increase the number of high-risk individuals being tested for HIV and PLWHA entering into medical care are discussed.

The specific aims of this study were to: 1) examine the association between having a regular medical care provider and high-risk behaviors for HIV infection, 2) examine the association between having a regular medical care provider and being tested for HIV, and 3) identify variables associated with length of time for PLWHA to receive a CD-4 cell count or a viral load test — used as markers for entry into medical care — from the date of the first HIV positive test result.

The proposed hypotheses for specific aims one and two were that individuals at higher risk for HIV infection would be less likely to have a regular medical care provider, and individuals with regular medical care providers would be more likely to have been tested for HIV in the last year. Specific aim three was an exploratory study to examine different possible factors relating to entrance into medical care for newly HIV diagnosed individuals.

High-Risk Behaviors and Medical Providers

Previous studies have evaluated different aspects of the 2006 CDC recommendations, with an emphasis on how often providers offer routine testing to their patients,[9-11] and how often are patients being tested for HIV?[12, 13] Persons with high-risk sexual or IDU behaviors are more likely to have been tested for HIV and other sexually transmitted diseases,[10, 14, 15] but there has not been an examination of the HIV risk profile for MSM who have regular medical care providers compared with those who do not. To better understand the potential impact of the 2006 CDC recommendations on HIV testing, it is important to understand the types of men that can be reached and the types of men that likely cannot be reached through routine medical providers.

Influence of Medical Providers on Testing

An important component of HIV prevention programs is testing among groups with high-risk behaviors for HIV, which include MSM. MSM may not seek HIV testing due to a perception of low disease risk by the individual, perception of lack of confidentiality by the health care providers, or fear of the consequences of a positive test.[16-19] MSM with a primary care provider are more likely to have ever had an HIV test

and to have been tested in the last year.[10, 13] For MSM, disclosure of sexual orientation to a provider is also associated with increased HIV testing.[10, 20] Black and Hispanic MSM, as well as bisexual men, are less likely to disclose their sexual orientation to a provider.[11, 21] Patients may not disclose their sexual orientation to providers because of concerns for discrimination and confidentiality.[22, 23] Providers may not ask about orientation because of discomfort discussing sexual behaviors.[24]

Overview of Obstacles to HIV Treatment

A review of the literature presents a number of potential barriers to accessing HIV medical care. Access to HIV medical care is usually defined in the literature in two possible ways: 1) regular visits, usually once every six months, to a medical care provider with knowledge of HIV, or 2) obtaining and correctly using HIV medications. Researchers often examine obstacles to HIV medical care or the use of medications in specific sub-groups such as MSM, non-native English speakers, or IDU or in specific settings such as rural or resource-poor settings. A review by John Bartlett et al. published in 2009 that examined the obstacles to effective highly active anti-retroviral therapy (HAART) in developing countries provides a good overview of potential obstacles and proposed solutions on dealing with these obstacles.[25] While my study only deals with medical access issues in Utah, understanding all possible barriers to medical care is important. Bartlett et al. in 2009 found that obstacles to antiretroviral therapy fell into three main categories: economic, which includes cost and infrastructure; socio-cultural, which includes stigma, health care system deficiencies, traditions and social norms, gender inequalities, media, and jealousy; and behavioral issues, which include personal enabling factors and lack of knowledge/misinformation.

HIV in Utah

In 2010, there were approximately 2550 HIV positive individuals living in Utah. The most common transmission risks among this group were MSM (55%), MSM/IDU (14%) and IDU (12%). The Utah Department of Health estimates that 28% of newly diagnosed individuals progressed to AIDS within one year,[26] and 20% to 28% of HIV-positive individuals who know their status are out of medical care.[27]

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CHAPTER 2

HEALTH CARE PRIORITIES AND HEALTH CARE ACCESS AMONG UTAH MEN WHO HAVE SEX WITH MEN

Abstract

My objective was to assess health care priorities, access to primary care, and HIV risk exposures among men who have sex with men (MSM) in Utah. I used community-based participatory methods to distribute a self-administered survey in 2009 to MSM in Utah. A total of 873 respondents were included in the study. The primary outcome examined was having a regular medical provider. The primary exposures were high-risk behaviors (sexual behaviors and history of injection drug use) for HIV infection. Five hundred twenty-three men (60%) in this study reported having a regular medical provider. Factors associated with an increased chance of having a regular medical provider were increased education, being 45 years of age or older, and increased income. For MSM, the total number of sex partners (p=0.16), the type of sex partner (p=0.6), or the use of condoms during anal sex (p=0.97) were not significantly associated with having a regular medical care provider. However, MSM with a history of injecting drugs was marginally significant ((AOR=0.45; 95% CI=0.2–1.02) for being less likely to have a provider. It is important for providers to understand that MSM who access health care

engage in a wide range of HIV-risk behaviors, therefore all MSM patients need to be screened regularly regardless of the HIV-risk the provider is assigning to the patient.

Introduction

According to the Centers for Disease Control and Prevention (CDC) an estimated 1.2 million individuals are living with HIV infection in the United States, and approximately 25% of these individuals are unaware of their HIV status.[1] For men who have sex with men (MSM), the rates of HIV infection are much higher. In 2006, MSM accounted for more than half (53%) of all new cases and made up 53% of the population living with HIV.[2] In Utah the proportion of MSM among incident infections is even higher at 72%, and 21% of the incident infections are MSM who are also injecting drug users (MSM/IDU).[3]

For persons who test positive, it is not uncommon to test late in their HIV disease. One large study found that 45% of persons diagnosed with AIDS were newly diagnosed with HIV less than one year prior to their AIDS diagnosis.[4] In Utah, 28% of newly diagnosed individuals in 2010 progressed to AIDS within one year.[3] Early identification of HIV is beneficial for the reduction of HIV transmission,[5, 6] the preservation of the immune system,[7] and reduction in HIV-related-illnesses.[8, 9]

In 2006, in an effort to increase the number of individuals aware of their HIV status, the Centers for Disease Control and Prevention (CDC) released new HIV testing guidelines recommending that healthcare providers universally screen their patients.[10] Annual screening is recommended for patients at higher risk for HIV, which include MSM who have new partners since their last HIV test.[10]

Past studies have evaluated different aspects of the 2006 CDC recommendations: to what extent are providers aware of the testing guidelines,[11] how often do providers offer routine testing to their patients,[11-13] and how often are patients being tested for HIV?[14, 15] Studies have not examined in detail the HIV risk profile for MSM who have regular medical care providers compared with those who do not. It is important to understand the types of men that can be reached through providers and those that are better reached through other testing avenues to best target testing within the MSM population.

Because of the recommendations' focus on medical care provider screening, I examined the association between high risk behaviors (sexual behaviors and injecting drug use) for HIV infection and having a primary care doctor among MSM. My objective was to characterize HIV risk behaviors for the MSM population who have regular medical care providers compared to HIV risk behaviors for MSM who do not have providers. My hypothesis was that individuals with higher-risk behaviors would be less likely to have a regular medical care provider.

Methods

During the summer and fall of 2009, 1033 participants completed a cross-sectional self-administered questionnaire named GUS — the **G**ay and Bisexual **U**tah **S**urvey of Men. Participants were eligible if they were male, 18 years or older, a Utah resident, and self-identified as gay, bisexual, or have ever had sex with a man.

The study was conducted using a community-based participatory research (CBPR) framework. The research team partnered with 18 community organizations involved with gay and bisexual issues. The organizations provided input on the study

questionnaire, the venues to be sampled, and promoted the survey in the gay community. The Department of Psychology at the University of Utah and the Communicable Disease Prevention Program at the Utah Department of Health were the two lead partners in the development of the questionnaire. This study was approved by the University of Utah Institutional Review Board.

Survey Development and Content

The GUS questions and format were based on a survey in Arizona called Heads Up.[16] Questions from the Heads Up survey were evaluated using 'think out loud' interviews with Utah MSM This is a process used to evaluate the correctness and validity of a questionnaire by having informants from the target population read a question and then speak out loud how he or she interprets the question as it is being cognitively processed.[17] After a draft of GUS was complete, the survey was sent out to all 18 of the participating organizations for comments and to ensure all desired questions were included. GUS data were entered real time into an SPSS database as the questionnaires were collected to help identify any potential problems with questions and answers. GUS collected data on demographics, knowledge of HIV services, HIV testing, sexual behaviors, drug use, priorities, and involvement in gay, lesbian, bisexual, and transgender (GLBT) activities.

The main exposures for this study were high-risk behaviors (injection drug use and sexual behaviors) for HIV infection. Injection drug use was assessed by the question, "In the past six months, how many times did you use a needle or works to inject drugs?" The possible categorical responses were: I have never done this; not in the last 6 months;

1–5 times; once a month or more, but less than once a week; once a week or more, but not every day; and every day or more.

There were 17 questions in GUS relating to sexual behaviors. The questions asked about type of relationships (casual or steady partner), number of sex partners, type of sexual intercourse (vaginal sex, insertive or receptive anal sex), and use of condoms during sex. Three variables were used to examine high-risk sexual behaviors that occurred in the last three months. The first variable was the number of overall sex partners and it was asked directly in the survey. The second variable was a derived composite variable that accounted for the type of sex partners. A sex partner could be monogamous, casual, or anonymous. An anonymous partner was defined as a sex partner met online, in a bathhouse, a private sex club, or a public cruising setting such as a park, alley, or adult bookstore. The third variable was a derived composite variable that measured the use of condoms during anal sex with a man whom the respondent was not in a steady relationship — a steady relationship was defined as a relationship lasting more than six months.

The main outcome, having a regular medical care provider, was assessed by the question, “Do you have a primary care physician or other doctor that you see regularly? (Yes/No)”. The definition of ‘regularly’ was not provided in the survey, and relied on the respondent to determine the meaning. The term provider was used to account for individuals who consider a nurse practitioner or a physician assistant to be their doctor.

In order to collect more contextual information, the respondents were provided a list of 15 common concerns for men and asked to rank the top five issues or problems they think the most about; an option to list other concerns was provided. Three composite

variables for thematic domains (economic, relationships, and health) were created from the response list. The composite variables were ordinal with three levels: high priority or concern, low priority or concern, and not a priority or concern. The 15 concerns and the three composite variables are listed in Table 2.2.

Participants were asked two questions to assess their sexual orientation. The question "How would you describe your sexual orientation?" used a categorical response [gay/bisexual/straight/queer/not sure/other]. There was a follow-up question "How would you describe your sexual attraction?" that used a 7-point scale. Possible responses ranged from "only attracted to males" to "only attracted to females" with the midpoint being "equally attracted to males and females."

I asked participants two questions to assess how open they were about their sexual orientation. The question "Does your doctor know that you are gay or bisexual or otherwise have sex with men?" used a categorical response [yes/no/not applicable (I don't have a doctor or primary care physician that I see regularly)]. The question "How open with other people or "out of the closet" are you about your sexual orientation or about your relationship with other men?" used a 5-point scale. Possible responses ranged from "not out to anyone" to "out to almost everyone."

Recruitment

I worked with gay and bisexual communities to select venues from which to recruit a diverse MSM population and then sent volunteers to the venues to distribute GUS. Venues were chosen that were gay-oriented such as Pride Festival, organizations with gay-oriented services such as the Utah AIDS Foundation, and venues such as coffee-houses and movie theaters identified by community partners to have a high proportion of

gay clients. My community-based sampling method is non-probabilistic since the time and location of the recruitment venues were not chosen randomly, but instead chosen based on when community informants believed a large number of eligible gay men would likely be present.

The survey was distributed by volunteers who approached individuals at the specified locations and offered a written survey. If an individual was interested in the survey but was not able to complete it then, the individual was given a small business card with the address of the website for online completion of the survey. The questions on the online and written survey were identical.

Participation

Overall 1033 surveys were received. After excluding survey respondents who did not meet the eligibility criteria (n=30) or who provided incomplete responses (n=17), the number of eligible respondents was 986. If a respondent self-identified as heterosexual, but indicated they were sexually attracted to males or had sex with another man in the last 3 months, they were included in the study. Respondents with missing information for the outcome and main exposure variables (n = 52) were excluded. Respondents who were HIV positive (n=57) were also excluded. The final analysis for this study included 873 respondents. This is the largest survey of gay men in Utah to date.

Data Analyses

Data were analyzed using SAS, version 9.2 (SAS Institute, Cary, NC). Descriptive statistics were calculated and compared between men who report regular medical providers and men who do not. Odds ratios (ORs) and 95% confidence intervals

(CIs) were used to determine measures of effects. I examined differences between respondents who have a regular medical provider and those who did not have a regular medical provider using chi-square statistics. Fisher's exact test was used to examine differences when the sexual orientation variable was involved since some cells had expected counts of five or less. The Kruskal Wallis test was used to examine differences for the ordinal composite priority variables (health, relationships, and economic).

For the outcome of having a regular medical provider, I examined the influence of socio-demographics (race/ethnicity, education, age), sexual behaviors, drug use, sexual orientation, and history of HIV testing.

The independent factors associated with having a regular medical provider at a significance level of $p<0.2$ were considered for inclusion in the final multiple logistic regression model. Possible predictor variables were examined using a step-wise logistic regression model to determine the most appropriate set of variables for prediction of having a provider. A sensitivity analysis was conducted by including the HIV positive individuals from the study sample and examining the effect on the analysis.

Results

Approximately three-quarters of the respondents were White non-Hispanic (80%) with the remainder of the sample being Hispanic (11%) and a mix of other racial or ethnic groups (10%). The mean age of the respondents was 34 years (standard deviation = 12.3 years), and 49% had graduated from college. In self-reported sexual orientation, 81% were gay, 12% were bisexual, 1% were heterosexual, and 6% were other. See Table 2.1 for demographic characteristics of the participants.

Among all eligible respondents, 523 (60%) men reported having a regular medical provider and 350 (40%) reported not having a regular medical provider. The men who had a regular medical provider were significantly more likely to be older ($p < 0.0001$), have more education ($p< 0.0001$), to be White ($p< 0.01$), to have a higher income ($p < 0.0001$), and to have ever received an HIV test ($p < 0.01$).

The majority of men (79%) had at least one sex partner in the last 3 months. There was a wide distribution of number of partners in the last 3 months. The most common response was one partner (34%) while a small percentage (2%) had 21 or more sex partners in the last 3 months. Less than half (42%) of the men had at least one anonymous sex partner in the last 3 months that they met online or in a public setting. There were 324 men (367%) who had anal sex without a condom at least once in the last 3 months with a casual partner. In the univariate analysis, I found no association between higher risk sexual behaviors and having a medical provider.

Four percent of the respondents (n=32) reported a history of injection drug use (IDU). Half of the respondents (n=16) injected drugs in the last 6 months and half (n=16) injected more than 6 months ago. Of the MSM with IDU risk in the last 6 months, two individuals shared a needle or drug works, and one of these two individuals had a regular medical provider. In the univariate analysis, individuals with a history of drug use were less likely to have a medical provider (Unadjusted Odds Ratio (UOR)=0.44; 95% CI=0.22–0.91) .

Among survey respondents, 459 (53%) men reported having an HIV test within the last year, 698 (80%) men were ever tested for HIV, while 174 (20%) men reported never being tested for HIV.

Potential differences between sexual orientation (MSM who self-identify as gay and MSM who self-identify as bisexual, heterosexual, or other) and high-risk behaviors were examined. MSM who do not identify as gay were more likely to have an increased number of anonymous sex partners; 40% of MSM who self-identify as gay had at least one anonymous sex partner in the last 3 months compared with 52% % of MSM who do not self-identify as gay ($p<0.02$). There was no significant difference in the use of condoms, the number of partners, or a history of injection drug use between the two groups.

I further explored the relationship between having a regular medical provider, engaging in high-risk behaviors, and disclosure of sexual orientation to the provider. Of the 523 MSM respondents with a regular medical provider, 335 (64%) disclosed their sexual orientation to their provider. MSM who did not use a condom during anal sex with at least one casual sex partner were significantly more likely ($p=0.01$) to disclose their sexual orientation to their regular medical provider. History of IDU, the number of sex partners, or the type of sex partner did not influence disclosure of sexual orientation to the provider.

With regards to the rankings of men's priority and concerns, the top ranked were finances (21.2%), a job or school (17.2%), and family (16.5%). Physical and mental health was chosen by 7.1% of men as the top priority, and HIV/AIDS was selected by 12.8% of the men as one of their top five priorities. Three broad composite variables (economic, relationships, and health) were created that contained similar priorities and concerns. See Table 2.2 for a ranking of all the priorities, concerns, and composite variables. In the univariate analysis, MSM who were older ($p<0.0001$) and used

condoms during anal sex ($p<0.01$) were more likely to have ranked health issues as one of their top five priorities. Economic and relationship priorities were not associated with any high-risk behaviors for HIV.

The final multivariable logistic regression model is presented in Table 2.3. Men with some college education (Adjusted Odds Ratio (AOR)=1.68; 95% CI=1.04–2.72), men with a professional or graduate degree (AOR=2.08; 95% CI=1.13–3.83), men 45 to 54 years of age (AOR=2.28; 95% CI=1.25–4.16), men 55 years and older (AOR=2.24; 95% CI=1.13–4.45), and men with incomes of $25,001 to $55,000 (AOR=1.56; 95% CI=1.06–2.28) and incomes over $55,001 (AOR=2.07; 95% CI=1.39–3.09) relative to men with incomes less than or equal $25,000 were more likely to have a regular medical provider. In the final model, the IDU behavior approached significance (AOR=0.45; 95% CI=0.2–1.02) as being less likely to have a medical provider. There were no significant differences between MSM who have higher-risk sex behaviors for HIV and MSM who have lower-risk sex behaviors for having a regular medical provider.

There were 51 HIV-positive individuals excluded from the study. All but one (98%) had a regular medical provider. Of the 51 individuals, 18% (n=9) had tested positive in the last 3 months while 61% (n=31) had tested positive 2 or more years ago. A sensitivity analysis was conducted by including the HIV positive individuals from the study sample and examining the effect on the analysis. When HIV positive individuals were included in the sample, IDU was no longer significant ($p=0.58$) but ever having been tested for HIV became significant with an increased change of having a regular medical provider (AOR= 1.51; 95% CI=1.04–2.20). There were no substantial differences regarding the sexual risk variables.

Discussion

I examined the relationship between engaging in high risk behaviors and having a regular medical provider among MSM in Utah through a cross-sectional survey. Five hundred and twenty three men (60%) in this study reported having a regular medical provider. I found a lower proportion of MSM with medical providers than have previous studies — 88% with providers among Boston MSM[18] and 76.4% with providers from a national survey of MSM.[12]

Factors associated with an increased chance of having a regular medical provider were increased education, being 45 years of age or older, and increased income. A national survey in 2009 examining characteristics of MSM who had visited a medical provider in the last 12 months found somewhat similar results — MSM with providers were more likely to be older, non-Hispanic, and more educated.[12] One difference in the national survey was that MSM with medical providers had fewer sex partners; my survey found no significant association between number of partners and having a medical provider. One possible reason for the difference may be that this study asked about the number of sex partners during the last 3 months while the study using the national survey used a 1-year time period.

Four percent of the MSM in the study had a history of injecting drugs and 37% had anal sex with at least one casual partner without using a condom in the last 3 months. I found that there was no association between having a regular medical provider and high-risk sexual behaviors. A history of injection drug use was marginally significant ($p=0.06$) for not having a provider.

Slightly more than half of the men (53%) were tested for HIV in the last year and 80% of the men had ever been tested for HIV. This is consistent with prior studies of MSM that reported percentages of 58–64% for testing within the last year and 76–91% for ever being HIV tested. [12, 19, 20] I found MSM with regular medical providers were 49% more likely to have ever been tested for HIV than MSM without a provider. Generally MSM with a primary care provider are more likely to have ever had an HIV test and to have been tested in the last year.[12, 15]

HIV risk-based testing in a health care setting can be problematic because providers do not recommend testing more to individuals at higher risk and providers can be uncomfortable asking about the sexual histories of their patients.[15, 21, 22] My findings demonstrate that medical providers have MSM patients with a range of risk-behaviors and self-identified sexual orientations. If a provider is uncomfortable asking about sexual orientation or sexual history, then providers should consider screening all patients for HIV since it is likely the provider has some patients at high-risk for HIV.

Economic issues were ranked as the most important priorities and concerns, followed by relationship issues, and then health issues. Twenty-five percent of MSM ranked health as their first or second priority. Because there were no follow-up questions on priorities, it is difficult to know why one priority or concern was ranked above another. For example, 17.2% of MSM ranked “a job or school” as their top priority, but it is uncertain if these men do not have a job or enough schooling or if they place high value on a job or education they currently possess. MSM who ranked health issues as high priority items were more likely to have a medical provider.

In Utah, the racial composition of the overall population is 83% White non-Hispanic, 12% Hispanic, and 5% other races.[23] While recruiting for GUS, it was the study team's intent to have the ethnic composition (Hispanic, non-Hispanic) of respondents be similar to the overall state ethnic composition. The final composition of the GUS sample at 78% White non-Hispanic, 12% Hispanic and 10% other closely resembles the Utah population. Although MSM completed the survey from each of the main minority racial categories (19 Native American respondents, 9 Black, 9 Pacific Islander, and 7 Asian), their numbers were too low to stratify into separate categories for analysis.

Strengths

This study is the largest known population-based sample of MSM in Utah. Because respondents were drawn from venues more diverse than traditionally sampled gay clubs and bars, the responses represent a broader segment of the MSM community.

Limitations

Survey respondents needed to feel comfortable disclosing their sexual behaviors and sexual orientation to be eligible for the study. This likely means that men in the study are more open about their sexual orientation and their social networks, and the number of MSM who identify as heterosexual or bisexual may be lower in this sample than the broader community. The results from this study may not be fully generalized to the MSM in Utah or the United States.

A second limitation is that survey responses are open to recall error and social desirability biases. Sexual risk behaviors may be underreported due to a desire for social acceptability or perhaps embarrassment reporting sexual information.

A final limitation is the survey was not specifically designed to assess the association between engaging in high-risk behaviors and having a regular medical provider. Only one question was used to determine if a man had a regular medical care provider and the term "regular" was not defined, leaving it open to interpretation by respondents.

Conclusions

For MSM, engaging in high-risk sexual behaviors or a history of injecting drugs was not significantly associated with having a regular medical care provider. It is important for providers to understand that MSM who access health care engage in a wide range of HIV-risk behaviors, therefore all MSM patients need to be screened regularly regardless of the HIV-risk category the provider has assigned to the patient.

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Table 2.1

Characteristics of Respondents in the Gay and Bisexual Utah Survey of Men (873 Respondents)

Characteristic	Has a Medical Care Provider, n (%)	Does Not Have a Medical Care Provider, n (%)	P value[c]
Total	523 (59.9%)	350 (40.1%)	
Race/Ethnicity			
White non-Hispanic	432 (62.2)	263 (37.8)	< 0.01
Hispanic	42 (45.7)	50 (54.4)	
Other	49 (57.0)	37 (43.0)	
Education			
High school graduate or less	44 (43.6)	57 (56.4)	< 0.0001
Some college or technical school	204 (59.0)	142 (41.0)	
College graduate	170 (59.9)	114 (40.1)	
Professional or graduate degree	105 (73.9)	37 (26.1)	
Age			< 0.0001
18–24 years of age	121 (53.1)	107 (46.9)	
25–34 years of age	152 (50.0)	152 (50)	
35–44 years of age	98 (63.6)	56 (36.4)	
45–54 years of age	85 (81.0)	20 (19.1)	
55 and older years of age	62 (80.5)	15 (19.5)	
Income			< 0.0001
$0–$25,000	117 (45.9)	138 (54.1)	
$25,001–$55,000	178 (59.9)	119 (40.1)	
Over $55,001	227 (71.6)	90 (28.4)	
Sexual Orientation			0.10
Gay	428 (60.5)	279 (39.5)	
Bisexual	66 (64.1)	37 (35.9)	
Heterosexual[a]	3 (37.5)	5 (62.5)	
Other[b]	26 (47.3)	29 (52.7)	
Number of Sex Partners in last 3 months			
No sex partner	107 (58.8%)	75 (41.2%)	0.29
1 sex partner	188 (63.7%)	107 (36.3%)	
2–3 sex partners	124 (59.9%)	83 (40.1%)	
4 or more sex partners	104 (55.0%)	85 (45.0%)	

Table 2.1 continued

Characteristic	Has a Medical Care Provider, n (%)	Does Not Have a Medical Care Provider, n (%)	P value [c]
Type of Sex Partner			0.58
None / Primary	198 (60.9)	127 (39.1)	
Casual	112 (63.3)	65 (36.7)	
Anonymous (online **OR** public)	172 (57.5)	127 (42.5)	
Anonymous (both online **AND** public)	41 (56.9)	31 (43.1)	
Sexual Behavioral Risk			
No anal sex, or anal sex only with condom	331 (60.3%)	218 (39.7%)	0.76
Anal sex without condom	192 (59.3%)	132 (40.7%)	
Injection Drug Use (IDU)			0.02
IDU in last 12 months	13 (40.6%)	19 (59.4%)	
No IDU in last 12 months	510 (60.6%)	331 (39.4%)	
Disclosed sexual orientation to regular medical care provider	372 (100%)	N/A	N/A
Disclosed sexual orientation to half or more of family/friends	425(59.6%)	288 (40.4%)	0.70
Ever tested for HIV	435 (62.3%)	263 (37.7%)	<0.01
Received HIV Test in past year	292 (63.6%)	167 (36.4%)	0.02

[a] These individuals self-identified as heterosexual but are attracted to other males or had sex with another man in the last 3 months.

[b] Other includes men who self-identified as queer, not sure, and other categories

[c] Chi-squared test or Fisher exact test

Table 2.2

Ranking of Priorities and Concerns among Respondents in the Gay and Bisexual Utah Survey of Men and Association with Having a Medical Provider (873 Respondents)

Priorities and Concerns	1st (%)	2nd (%)	3rd–5th (%)	**P value** [a]
Economic				0.28
Finances/money	21.2	18.2	30.5	
Job or school	17.2	12.0	31.0	
Your house/apt/living situation	1.5	3.6	18.0	
Relationships				0.52
Your family	16.5	14.8	32.4	
Your friends	3.6	12.1	30.9	
Finding men and women to date	7.9	7.9	23.0	
Your romantic partner	13.0	10.9	13.7	
Health				< 0.01
Your physical/mental health	7.1	6.7	33.4	
Being physically fit	1.5	3.6	25.9	
HIV/AIDS	2.3	2.6	7.8	
Sexually transmitted diseases	0.2	1.2	8.7	
Your civil rights as a gay/bi man	4.0	3.4	24.2	
Religion	2.4	2.2	7.6	
Drugs or alcohol	0.4	0.2	4.1	
Immigration	0.6	0.4	2.6	
Other	0.6	0.2	1.0	

[a] Association between Economic, Relationships, and Health Composite variables and having a medical provider using chi-squared test

Table 2.3

Multivariable Logistic Regression Analysis with the Outcome of Having a Regular Medical Provider, Final Model (826 GUS Respondents)

Characteristic	Adjusted Odds Ratio (95% Confidence Intervals)
Injecting Drug Use (p=0.055)	0.45 (0.20—1.02)
Race/Ethnicity (p=0.38)	
White	1 (Reference)
Hispanic	0.71 (0.43–1.17)
Other	1.04 (0.64–1.70)
Education (p=.08)	
High school graduate or less	1 (Reference)
Some college or technical school	1.68 (1.04–2.72)
College graduate	1.43 (0.86–2.38)
Professional or graduate degree	2.08 (1.13–3.83)
Income (p=0.002)	
$0–$25,000	1 (Reference)
$25,001–$55,000	1.56 (1.06–2.28)
Over $55,001	2.07 (1.39–3.09)
Age (p<0.0001)	
18–24 years of age	1 (Reference)
25–34 years of age	0.68 (0.46–1.01)
35–44 years of age	0.99 (0.60–1.61)
45–54 years of age	2.28 (1.25–4.16)
55 and older years of age	2.24 (1.13–4.45)
Ever tested for HIV (p=0.08)	1.4 (0.96–2.04)

CHAPTER 3

THE ASSOCIATION BETWEEN HAVING A MEDICAL CARE PROVIDER AND HIV TESTING AMONG MEN WHO HAVE SEX WITH MEN IN UTAH

Abstract

The purpose of my study was to examine the association between receiving HIV testing and having a regular medical provider for men who have sex with men (MSM). I used community-based participatory methods to distribute a self-administered survey in 2009 to MSM in Utah. HIV positive individuals were excluded from the analysis. The primary outcome examined was being tested for HIV in the last 12 months. The primary exposure was having a regular medical provider. Of the 919 MSM surveyed, 489 (53%) reported having an HIV test within the last year and 553 (60%) reported having a regular medical provider. MSM with a regular provider (adjusted odds ratio (AOR)=1.08; 95% confidence interval (CI) 0.73–1.59) were no more likely to be tested for HIV than MSM without a provider unless the MSM had disclosed their sexual orientation to their providers (AOR=2.09; 95% CI 1.48–2.94). I identified no benefit to having a regular medical provider who is unaware of a patient's sexual orientation. Interventions to improve communication between medical providers and MSM may increase HIV screening in this population.

Introduction

The majority of new HIV infections are transmitted from HIV positive persons unaware of their status.[1] Individuals often decrease high-risk behaviors for HIV once they become aware of their status, which is one reason the Centers for Disease Control and Prevention (CDC) has stressed the importance of knowing one's HIV status. In 2006, the CDC released new HIV testing guidelines recommending that healthcare providers offer HIV testing to all individuals (universal testing) and providers annually screen persons who are at high risk for infection. Persons at high risk include men who have sex with men (MSM) who have had more than one sex partner in the last year.[2]

MSM continue to bear a disproportionate amount of new HIV infections. CDC estimates that MSM comprise 2% of the US population, yet more than half (53%) of new infections are among MSM.[3] In Utah the proportion of MSM among incident infections is even higher at 72%, and 21% of the incident infections are MSM who are also injecting drug users (MSM/IDU).[4]

MSM may not seek HIV testing due to a perception of low disease risk by the individual, perception of lack of confidentiality by the health care providers, or fear of the consequences of a positive test.[5-8] MSM with a primary care provider are more likely to have ever had an HIV test and to have been tested in the last year.[9, 10] For MSM, disclosure of sexual orientation to a provider is also associated with increased HIV testing.[9, 11] Black and Hispanic MSM, as well as bisexual men, are less likely to disclose their sexual orientation to a provider. [12, 13] Patients may not disclose their sexual orientation to providers because of concerns with discrimination and confidentiality.[14, 15]

Providers may not ask about orientation because of discomfort discussing sexual behaviors.[16]

The majority of studies of MSM and HIV testing take place in highly urbanized areas with relatively higher HIV incidence which may contain health care providers that are more comfortable providing care to MSM and who may be more likely to be a sexual minority themselves.[11, 13, 17, 18] MSM with providers perceived to be more gay-friendly are more likely to have disclosed their sexual orientation to their providers.[11, 15, 19] Thus, there is a gap in the literature about HIV testing behaviors and the impact of providers for MSM among low-incidence HIV states. The estimated rate of HIV diagnosis in the United States was 21.1 per 100,000 population while in Utah the rate was 6.5 per 100,000 population.[20]

Because the CDC recommendations for annual screening depend largely on medical providers to implement the testing, I examined the relationship between having a regular medical provider and HIV testing in the last year among a sample of MSM in Utah using a cross-sectional design. I also examined the relationship between HIV testing and disclosure to the provider of sexual orientation and other participant characteristics.

Methods

During the summer and fall of 2009, 1033 participants completed a cross-sectional self-administered questionnaire named GUS — the **G**ay and Bisexual **U**tah **S**urvey of Men. Participants were eligible if they were male, 18 years or older, a Utah resident, and self-identified as gay, bisexual, or have ever had sex with a man.

The study was conducted using a community-based participatory research (CBPR) framework. The research team partnered with 18 community organizations involved with gay and bisexual issues. The organizations provided input on the study questionnaire, the venues to be sampled, and increasing awareness about the survey in the gay community. The Department of Psychology at the University of Utah and the Communicable Disease Prevention Program at the Utah Department of Health were the two lead partners in the development of the questionnaire. This study was approved by the University of Utah Institutional Review Board.

Survey Development and Content

The GUS questions and format were based on a survey in Arizona called Heads Up.[21] Questions from the Heads Up survey were evaluated using 'think out loud' interviews. This is a process used to evaluate the correctness and validity of a questionnaire by having the respondents read a question and then speak out loud how he or she interprets the question as it is being cognitively processed.[22] After a draft of GUS was complete, the survey was sent out to all 18 of the participating organizations for comments and to ensure all desired questions were included. GUS survey data were entered real time into an SPSS database as the questionnaires were collected to help identify any potential problems with questions and answers.

The main exposure for this study was the answer to the question, "Do you have a primary care physician or other doctor that you see regularly? (yes/no)" The main outcome, HIV testing, was assessed by the question, "When was the last time you were tested for HIV? 1) I have never been tested; 2) In the last 3 months; 3) 3–6 months ago; 4) 7 months to 1 year ago; 5) 1–2 years ago; 6) More than 2 years ago."

Participants were asked two questions to assess how open they were about their sexual orientation. The question "Does your doctor know that you are gay or bisexual or otherwise have sex with men?" used a categorical response [yes/no/not applicable (I don't have a doctor or primary care physician that I see regularly)]. The question "How open with other people or "out of the closet" are you about your sexual orientation or about your relationship with other men?" used a 5-point scale. Possible responses ranged from "not out to anyone" to "out to almost everyone."

There were seventeen questions in GUS relating to sexual behaviors. The questions asked about type of relationship (casual or steady partner), number of sex partners, type of sexual intercourse (vaginal sex, insertive or receptive anal sex), and use of a condom during sex. I choose to define high risk sexual behavior as a man having unprotected anal sex with another man in the last three months with whom he is not in a steady relationship. A steady relationship was defined as a relationship lasting more than six months.

Recruitment

I worked with communities to select venues from which to recruit a diverse MSM population and then sent volunteers to the venues. Venues were chosen that were gay-oriented such as Pride Festival, organizations with gay-oriented services, and venues such as coffee-houses and theaters identified by community partners to have a high proportion of gay clients. The community-based sampling method is nonprobabilistic since the time and location of the venues were not chosen randomly, but instead chosen based on when there would be the greatest chance of finding a large number of gay men at the venue.

The survey was distributed by volunteers who approached individuals at the specified locations and offered a written survey. If an individual was interested in the survey but was not able to complete it then, the individual was given a small business card with the address of the website for online completion of the survey. The questions on the online and written survey were identical.

Participation

Overall 1033 surveys were received. After excluding survey respondents who did not meet the eligibility criteria (n=30) or who provided incomplete responses (n=17), the number of eligible respondents was 986. If a person self-identified as heterosexual and either was attracted a lot to males or had sex with another man in the last 3 months, they were included in the study. There were 57 (6%) respondents who self-identified as HIV positive and they were excluded from the analysis. The reason for this exclusion is HIV positive men would not continue to be tested for HIV so HIV testing guidelines would no longer apply – 34 (59.7%) of the HIV positive men last tested 2 or more years ago. An additional reason is that newly diagnosed individuals are strongly encouraged to enter medical care and the question on the survey does not distinguish between having a regular medical provider before being tested or having one after receiving a positive test. The final analysis for this study included 919 survey respondents. This is the largest known survey of gay men in Utah regarding HIV and general health.

Data Analyses

Data were analyzed using SAS, version 9.2 (SAS Institute, Cary, NC). Descriptive statistics were calculated and compared between men who reported having an

HIV test within the last year and men who either never had an HIV test or who received an HIV test, but not within the last year. Missing values were less than 2% for all questions used for this analysis except for the sexual risk questions that were missing 5% of the values. Odds ratios (ORs) and 95% confidence intervals (CIs) were used to determine measures of effects. I examined differences between respondents who had tested within the last year and respondents who have never tested using chi-square statistics. Fisher's exact test was used to examine differences when the sexual orientation variable was involved since some cell's had expected counts of five or less. The independent factors associated with HIV testing in the last year at a significance level of $p<0.2$ were considered for inclusion in the final multiple logistic regression model. Possible predictor variables were examined using a step-wise logistic regression model to determine the most appropriate set of variables for prediction of HIV testing.

For the outcome of HIV testing within the past year, I examined the influence of socio-demographics (race/ethnicity, education, age), sexual behaviors, disclosure of sexual orientation to a provider, and disclosure of sexual orientation to family/friends. I also created a composite predictor variable to analyze the influence of the provider on HIV testing that had three levels: does not have a regular provider, has a regular provider but not 'out' (disclosure of sexual orientation) to provider, and has a regular provider and is out to provider.

Results

Approximately three-quarters of the respondents were White non-Hispanic (78%) with the remainder of the sample being Hispanic (12%) and a mix of other racial or ethnic groups (10%). The mean age of the respondents was 33 years (standard deviation

= 12.3 years), and 47% had graduated from college. In self-reported sexual orientation, 81% were gay, 11% were bisexual, 1% were heterosexual, and 7% were other.

Among all eligible respondents, 489 (53%) men reported having an HIV test within the last year, 742 (80%) men were ever tested for HIV, while 182 (20%) men reported never being tested for HIV. Those who had been tested in the last year were significantly more likely ($p < 0.001$) to be younger, to have disclosed their sexual orientation to their provider, to have disclosed their sexual orientation to friends/family, and to have engaged in anal sex without a condom in the last 3 months. In addition, there were significant associations with being tested in the last year and having a regular care provider ($p=0.02$), being Hispanic ($p=0.03$), and having an increased income ($p=0.04$) (Table 1).

Sixty percent of respondents had a regular medical provider and 40% did not have a regular provider. Of the 553 MSM with a regular provider, 351 (63%) had disclosed their sexual orientation to their provider. The percentage of men who disclosed to their provider was significantly higher for men who self-identifies as gay (68%) or 'other' (57%) than men who self-identify as bi-sexual (42%) or straight (20%). Most of the men (81%) had disclosed their sexual orientation to at least half or more of their friends and family.

There were 325 men (35%) who had anal sex without a condom at least once in the last 3 months. The number of men reporting this risk behavior had a greater chance of being HIV tested (67%) compared with men who were HIV tested and did not have the risk behavior (45%).

The final multivariate logistic regression model is presented in Table 3.2. Hispanic men (AOR, 1.91; 95% CI, 1.16–3.16), men out to half or more of their friends and family (AOR=1.58; 95% CI 1.08–2.33), and men with higher risk sexual behaviors (AOR=2.41; 95% CI 1.79–3.26) were more likely to have been tested in the last year. Men in the oldest age group, 55 years old and older, (AOR, 0.43; 95% CI, 0.24–0.76) were less likely to have been tested compared with the youngest age group, 18 to 24 years old. In the final model, there was no significant difference between MSM who have a provider and MSM who did not have a provider for HIV testing (AOR=1.08; 95% CI 0.73–1.59), unless the man disclosed his sexual orientation to his provider (AOR=2.09; 95% CI 1.48–2.94).

Among those who were tested for HIV, the most common test site was at community based-organizations (36%) followed by a doctor's office (23%) and the local health departments (22%). I examined differences between men who tested at the doctor's office and men who tested at sites other than a doctor's office using chi-square statistics. From the co-variates listed in Table 3.1, the co-variates significantly associated with the type of test site were having a regular medical provider, being out to the provider, and income (all significant at $p < 0.001$). Men with lower incomes were less likely to test at a doctor's office.

In an additional, multinomial logistic regression model, I examined three outcomes simultaneously: not tested for HIV in the last 12 months, tested in the last 12 months at a doctor's office, and tested at any site except for a doctor's office in the last 12 months. The multinomial model was adjusted for the same variables as the multivariate logistic regression model described shown in Table 3.2. Men who had a

provider who knew their sexual orientation were more likely to have received HIV testing at the doctor's office (AOR=7.31; 95% CI 3.78–14.14), and also more likely to have received HIV testing at sites other than a doctor's office (AOR=1.65; 95% CI 1.13–2.41).

Discussion

I examined the relationship between having a regular medical provider and HIV testing among MSM in Utah through a cross-sectional survey. Slightly more than half of the men (53%) were tested for HIV in the last year and 80% of the men had ever been tested for HIV. This is consistent with prior studies of MSM that reported percentages of 58-64% for testing within the last year and 76 – 91% for ever being HIV tested. [9, 23, 13] In this study, Hispanic MSM were significantly more likely to have been tested for HIV in the last year.

I found that there was no association between having a medical care provider and being tested for HIV in the last year unless the man disclosed his sexual orientation to his provider. This finding suggests the importance of interventions that improve communication between doctors and patients regarding disclosure of sexual orientation.

I was intrigued to find the importance of disclosure to a provider persisted in the multinomial model even when the outcome was 'tested at any site except for a doctor's office in the last 12 months' (AOR=1.65; 95% CI 1.13–2.41). Why would disclosure of a man's sexual orientation to a provider increase his odds of being tested at sites outside of the doctor's office?

Possible explanations may be that the provider is referring the patient to be tested somewhere else (perhaps due to cost) or 'disclosure to a provider' is a proxy measure for

outness to health professionals in general or perhaps better risk-behavior communication to health professionals. In a study among gay, lesbian, and bisexual (GLB) adolescents, while 70% of GLB adolescents described themselves as out to most people, only 35% reported their physician knew of their orientation.[14] These findings are reflected in the study; 73% of the respondents were out to most of their friends and family, while only 63% were out to their regular medical provider. This indicates that disclosing to health professionals can relatively be a difficult group to disclose to for sexual minorities.

Half of the bisexual men had tested for HIV in the past year and 42% disclosed their sexual orientation to their providers. The percentages for testing and disclosure were lower for the bisexual men in this study than the gay men. Other studies have shown decreased testing among nongay identified MSM respondents compared with gay-identified respondents.[23-25] In a previous study looking specifically at disclosure to providers, none of the 86 bisexual respondents disclosed their orientation.[12] One possibility for the observed lower testing rates are that nongay identified MSM are less likely to have come in contact with information about HIV.[25] Another is that some men who self-report as bisexual may eventually later identify as gay but are at a stage of confusion or discomfort regarding their sexual orientation.

One interesting finding with the sample was the large percentage of men who were tested outside of a clinical setting. The most common place to be tested for HIV was at community based-organizations (36%) while less than a quarter of the men were tested in a doctor's office (23%) or at the hospital (2%). In other community-based studies, the majority of MSM are tested by private doctors (36-53%) or in

hospital/outpatient settings (18%); only 5% are tested in community organizations with HIV counseling and testing services.[26, 27]

Of the 70 individuals who identified as 'straight', 'other', and 'not sure', 50 (71%) had sex with at least one man during the prior 3 months. This points to the importance of carefully framing survey questions about sexual orientation to allow for more nuanced responses when sexual orientation is an important predictive variable. The more traditional responses of gay, bisexual, and straight for sexual orientation without any additional categories or follow-up questions may not accurately capture some respondents.

In Utah, the racial composition of the overall population is 83% White non-Hispanic, 12% Hispanic, and 5% other races.[28] While recruiting for GUS, it was the study team's intent to have the ethnic composition (Hispanic, non-Hispanic) of respondents be similar to the overall state ethnic composition. The final racial/ethnic composition of the GUS sample at 78% White non-Hispanic, 12% Hispanic and 10% other closely resembles the Utah population. Although MSM completed the survey from each of the main minority racial categories (19 Native American respondents, 9 Black, 9 Pacific Islander, and 7 Asian), their numbers were too low to stratify into separate categories for analysis.

Strengths

This study is the largest known population-based sample of MSM in Utah. Because respondents were drawn from venues more diverse than traditionally sampled gay clubs and bars, the responses represent a broader segment of the MSM community.

Limitations

Survey respondents needed to feel comfortable disclosing their sexual behaviors and sexual orientation to be eligible for the study. This likely means that men in the study are more open about their sexual orientation with medical providers and their social networks, and the number of MSM who identify as heterosexual or bisexual may be lower in the sample than the broader community. The results from this study may not be fully generalized to the MSM in Utah or the United States.

A second limitation is that survey responses are open to recall error and social desirability biases. Sexual risk behaviors may be underreported due to a desire for social acceptability or perhaps embarrassment reporting sexual information.

A third limitation is the survey was not specifically designed to assess the influence of the provider on HIV testing. Only one question was used to determine if a man had a regular medical care provider and the term "regular" was not defined, leaving it open to interpretation by respondents. There were no questions asking if an HIV test was received because of a recommendation from a provider or if the disclosure of a man's sexual orientation was initiated by the provider or the client.

A final limitation is the survey was cross-sectional and not longitudinal. Because of this it is impossible to determine a temporal relationship between having a medical care provider and being tested for HIV. It is possible that an individual was first tested for HIV and then at a later point started to see a regular care provider or disclosed his sexual orientation to the provider.

Conclusions

Having a primary medical care provider is associated with increased HIV-testing among MSM, but only when men disclose their sexual orientation to their providers. I identified no benefit to having a primary care provider who is unaware of a patient's sexual orientation. Interventions to improve communication between primary care providers and MSM may increase HIV screening in this population.

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Table 3.1

Characteristics of Respondents in the Gay and Bisexual Utah Survey of Men (919 Respondents)

Characteristic	HIV test within last year, n (%)	No HIV test within last year, n (%)	P-value [c]
Total	489 (53.2)	430 (46.8)	
Race/Ethnicity			0.03
White non-Hispanic	374 (51.9)	346 (48.1)	
Hispanic	69 (65.1)	37 (34.9)	
Other	46 (49.5)	47 (50.5)	
Education			0.24
High school graduate or less	54 (48.2)	58 (51.8)	
Some college or technical school	206 (55.5)	165 (44.5)	
College graduate	158 (55.1)	129 (45.0)	
Professional or graduate degree	71 (47.7)	78 (52.4)	
Age			<0.01
18–24 years of age	131 (52.4)	119 (47.6)	
25–34 years of age	186 (59.1)	129 (41.0)	
35–44 years of age	91 (56.5)	70 (43.5)	
45–54 years of age	48 (44.4)	60 (55.6)	
55 and older years of age	29 (36.7)	50 (63.3)	
Income			0.04
$0–$25,000	131 (48.0)	142 (52.0)	
$25,001–$55,000	181 (58.4)	129 (41.6)	
Over $55,001	173 (52.4)	157 (47.6)	
Sexual Orientation			0.13
Gay	405 (54.4)	339 (45.6)	
Bisexual	52 (49.5)	53 (50.5)	
Heterosexual [a]	2 (20.0)	8 (80.0)	
Other [b]	30 (50.0)	30 (50.0)	
Ever Tested for HIV			
No	0	182 (100.0)	
Yes	489 (66.4)	248 (33.7)	

Table 3.1 continued

Characteristic	HIV test within last year, n (%)	No HIV test within last year, n (%)	P-value
Total	489 (53.2)	430 (46.8)	
Regular Medical Provider			
No	177 (48.4)	189 (51.6)	
Yes	312 (56.4)	241 (43.6)	
Disclosure of Sexual Orientation to Provider [Only included respondents with a provider (n=553)]			<0.0001
No	87 (43.1)	115 (56.9)	
Yes	225 (64.1)	126 (35.9)	
Disclosure in General			<0.001
Not Out/Out to Only a Few	67 (39.0)	105 (61.1)	
Out to half or more of family/friends	422 (56.5)	325 (43.5)	
Sexual Risk Variables			<0.0001
No Anal Sex, or anal sex only with condom	246 (44.6%)	306 (55.4%)	
Anal Sex without condom	216 (66.5%)	109 (33.5%)	

[a] These individuals self-identified as heterosexual but are attracted to other males or had sex with another man in the last 3 months.

[b] Other includes men who self-identified as queer, not sure, and other categories

[c] Chi-squared test or Fisher exact test

Table 3.2

Multivariable Logistic Regression Analysis with the Outcome of Being Tested for HIV within the Last Year, Final Model (866 GUS Respondents)

Characteristic		Adjusted Odds Ratio
Race/Ethnicity		
	White	1 (Reference)
	Hispanic	1.91 (1.16-3.16)
	Other	0.98 (0.61-1.59)
Age		
	18-24 years of age	1 (Reference)
	25-34 years of age	1.29 (0.88-1.89)
	35-44 years of age	0.87 (0.54-1.38)
	45-54 years of age	0.61 (0.36-1.04)
	55 and older years of age	0.43 (0.24-0.76)
Income		
	$0-$25,000	1 (Reference)
	$25,001-$55,000	1.49 (1.02-2.16)
	Over $55,001	1.44 (0.98-2.12)
Regular Medical Provider		
	No	1 (Reference)
	Yes, but did not disclose orientation	1.08 (0.73-1.59)
	Yes and did disclose orientation	2.09 (1.48-2.94)
Disclosure in General		
	Not out/out to only a few	1 (Reference)
	Out to half or more of family/friends	1.58 (1.08-2.33)
Sexual Risk Variables		
	No anal sex, anal sex only with condom	1 (Reference)
	Anal sex without condom	2.41 (1.79-3.26)
Education	Not included in final model	
Sexual Orientation	Not included in final model	
Ever Tested for HIV	Not included in final model	

*These individuals self-identified as heterosexual but are attracted to other males or had sex with another man in the last 3 months.

**Other includes men who self-identified as queer, not sure, and other categories

CHAPTER 4

FACTORS RELATING TO TIME TO ENTRY INTO MEDICAL CARE AFTER DIAGNOSIS OF HUMAN IMMUNODEFICIENCY VIRUS

Abstract

HIV treatments are more effective if started early in the course of infection. However, individuals who test positive may delay entering into medical care. Delays in care result in poorer health outcomes and increased long-term health costs. I used the time between the first HIV diagnosis and the first reported CD4 cell count or HIV viral load test to measure the length of time to entry into medical care and examine factors related to late entry. Data were taken from the Utah HIV/AIDS Reporting System database from 2006 to 2010, and Cox proportional hazards regression was used to calculate hazard ratios and identify variables associated with delayed entry into medical care. Of the 522 newly HIV diagnosed individuals, 340 (65.1%) persons entered care within the first 90 days, 109 (20.9%) after 90 days, and 73 (14.0%) persons never entered care. In the multivariate model, delayed care was associated with no identified (NIR) risk [Hazard Ratio (HR) = 0.62; 95% Confidence Interval (CI) = 0.43–0.88] while a combined transmission risk category of men who have sex with men and inject drugs [HR= 1.27; 95% CI= 0.99–1.63] was marginally associated with earlier entry to care. Sex and race/ethnicity were included in the model as potential confounders. Approximately

one-third of newly diagnosed individuals were not linked to care within the first 90 days demonstrating the need for better linkage to care by medical care providers and HIV counselors who provide test results. Individuals with NIR may benefit from more extensive or additional post-HIV test counseling or case management to identify the perceived barriers to medical care.

Introduction

When a person tests positive for HIV infection, it is important to provide appropriate referrals and linkages to medical care so that the person can transition enter into care with minimal difficulty. The Centers for Disease Control and Prevention (CDC) recommends that individuals enter care within 3 months of the HIV diagnosis.[1] However delays in care are still common. In one study, researchers showed that approximately 40% of newly diagnosed HIV cases in Missouri had not initiated care one year after testing positive, mainly due to the individuals feeling healthy and seeing no need for medical care.[2]

Human Immunodeficiency Virus (HIV) treatments are more effective if started early in the course of infection. However many individuals delay entry into medical care after testing positive.[3-7] Delay in medical care can result in a weaker immune system, an increased number of co-morbidities, and a quicker progression to an AIDS diagnosis as well as increased hospital care costs and the need for immediate initiation of anti-retrovirals, resulting in higher health care costs. [8-11]

In addition, medical care for HIV positive individuals is a HIV prevention strategy since risk-reduction counseling can be accessed, and the possibility of viral transmission is greatly decreased when a person is taking appropriate HIV medications.[12-

[14] Despite these benefits, an estimated one-third of individuals in the United States who know their HIV status may not be receiving appropriate medical care.[15] In Utah, it is estimated from eHARS data that 20% to 28% of HIV-positive individuals who know their status are out of medical care.[16]

According to Bartlett et al., obstacles to medical care and initiation of antiretroviral therapy generally fall into three main categories: economic such as cost and insurance; socio-cultural such as stigma, traditions and social norms; and behavioral issues, which include personal enabling factors and lack of knowledge/misinformation.[17] When researchers have specifically examined time to enter medical care, they have found delayed entry is associated with nonmetropolitan residence,[6] being heterosexual,[18, 19] and foreign birth.[7] Conflicting results have been identified for age[5, 6] and ethnicity.[4, 5]

Previous researchers have analyzed time from diagnosis to entry into care, but these studies have taken place in high-incidence HIV sites. In 2009, the estimated rate of HIV diagnosis in the United States was 21.1 per 100,000 population while in Utah the rate was 6.5 per 100,000 population.[20] There have also been conflicting results on factors that delay entry into care. I used population-based surveillance data from the Utah Department of Health to calculate time from first positive HIV test to first medical care visit for individuals who first tested positive for HIV during 2006–2010. The study objective was to identify potential risk factors for delayed entry into medical care in Utah so that possible interventions may be developed to increase access to care.

Methods

Data

Utah requires name-based reporting of all HIV and AIDS diagnoses, all positive Western blot tests for HIV antibody, every viral load and CD4 cell count lab report, and all HIV-related illnesses. Information on demographics and risk factors is also collected. This information is collected by the Utah Department of Health and stored in a population-based registry called the electronic HIV/AIDS Reporting System (eHARS). The data used for this study was a 5-year time period from 2006 to 2010. This study received approval from the University of Utah and the Utah Department of Health IRBs.

Study Population

A total of 746 people were diagnosed with HIV in the 5-year time period from 2006 to 2010. To be eligible for the study a person needed to be a resident of Utah when they received their initial HIV diagnosis; 146 individuals were excluded for receiving their initial diagnosis in another state. Individuals (n=78) were also excluded if they received a concurrent AIDS diagnosis with their HIV diagnosis. This was because CDC requires an AIDS diagnosis to be confirmed with a CD4 cell count < 200 mm^3 or a lab diagnosis of an opportunistic infection, which by definition for this study was entry into medical care. In the final dataset analyzed for the study, there were 522 individuals. See Figure 4.1 for participant flowchart.

Variable Definitions

The main outcome variable was time to entry into HIV medical care, which was calculated as the number of days between the initial diagnosis of HIV and the first CD4

cell count or viral load test, whichever date was first. This outcome was measured as a continuous variable. The CD4 cell count and viral load were reliable measures of entry into care since a medical care provider must order these tests. All CD4 cell count and viral load tests were required to be reported to the Utah Department of Health.

Race and ethnicity were combined into one race/ethnicity variable with four categories (White non-Hispanic, Hispanic, Black, and other).

The categories for the transmission risk variable were based on CDC's transmission categories.[21] In the eHARS database, each person was assigned to only one risk category, and if a person had more than one reported risk factor, they were assigned to the transmission category listed first in the hierarchy: male sexual contact with a male (MSM), injection drug use (IDU), MSM and IDU, heterosexual contact, no identified risk factor (NIR), no risk reported (NRR), and perinatal exposure. For this study, NIR and NRR were combined into one category.

The country of birth variable was dichotomous — born in the United States (yes or no).

For the facility variable, outpatient clinic included private physicians' offices and outpatient facilities. Community test sites were largely comprised of HIV counseling test sites and local health departments, but the category also included two family planning clinics and ten blood banks/plasma centers. The facility variable was not used in the final multivariate model due to 207 missing or uncertain values (39.6% of the data).

Analysis

SAS statistical software, version 9.1 (SAS Institute, Inc, Cary, North Carolina) was used for the analysis. Bi-variate methods (Chi-square, Kruskal Wallis, and Fisher's

exact tests) were used to test for overall broad associations between the independent variables and the dependent, categorical time variable which was divided into early entry into medical care (90 days or less), late entry (more than 90 days), and no entry into care.

I then conducted time to event analysis using the number of days between the first HIV diagnosis and the first lab (CD4 cell count or viral load) as the dependent variable. To build the model, the log-rank test was used for categorical variables and univariate Cox regressions were used for continuous variables to test for significance. Any variable found to have a significance level of less than 0.2 was initially included in the multivariate Cox proportional hazards regression models. The goal was to identify independent factors associated with the duration of time it takes for an HIV positive individual to enter medical care and to calculate hazard rates. This means that the interpretation for a hazards ratio above one was an increased probability each day for an individual with that characteristic to enter medical care.

All data used in this analysis were taken from the eHARS database as of December 31, 2011. This date was chosen to allow every individual at least one year to enter into medical care. Individuals meeting the following criteria were right-censored if they never entered medical care by December 31, 2011 (n=63); moved out of state before entering medical care (n=5); or died before entering into medical care (n=5). A total of 73 individuals were censored.

The proportional hazards assumption was assessed using statistical and graphing methods for each variable. The proportionality assumption was met for all the variables in the multivariate model. I identified a higher proportion of censored observations in the 'unknown/risk not identified' category for the risk of transmission variable. However I do

not believe it was informed censoring since the higher proportion of censoring in this category was not due to individuals who died or moved out of state.

Because the study time period was over 5 years, sensitivity analyses were conducted stratifying by year of diagnosis and by censoring all individuals who did not enter care within the first 365 days. This was done to examine the influence of diagnosis year on the outcomes.

Results

From January 1, 2006 to December 31, 2010, there were a reported total of 522 new HIV cases in Utah, with an average of 104 new cases each year (range, 82–123). This does not include cases that were concurrently diagnosed with HIV and AIDS. For this 5-year time period, 85.3% were male and 65.1% were white. The most common transmission risks for HIV infection were men who have sex with men (MSM) (55%), men who have sex with men and also inject drugs (MSM/IDU) (17.1%), and NIR/NRR (14.2%). The average age at diagnosis was 36 years (interquartile range (IQR), 27–43). See Table 4.1 for population characteristics information.

The site of first HIV diagnosis was missing or uncertain for 207 observations. For the 315 individuals with a known site, 124 (39.4%) had their positive HIV test at a doctor's office or an outpatient clinic and 191 (60.6%) were at a community test site. Community test sites diagnosed a higher proportion of White non-Hispanics (62.5%) and Hispanics (64.6%) compared with Blacks (30.8%) and other races (50%), a higher proportion of MSM (67.2%) and IDUs (68.4%) compared with heterosexuals (35%), and a higher proportion of U.S. born persons (64.8%) compared with foreign-born persons (49.3%).

Among the study population, 65.1% of individuals entered medical care within 90 days from their HIV diagnosis, 20.9% entered medical care sometime after 90 days, and for 14.0% there is no evidence of entry into medical care. Almost half (47.3%) of the newly diagnosed individuals entered care within the first 30 days. The average time to entry into medical care, excluding the individuals who never entered care, was 125 days and the median time was 30 days. Fifty-one individuals (9.8%) took more than a year to enter medical care.

In regards to the variables listed in Table 4.1, the only overall statistically significant difference between those who entered care within 90 days, those who entered care after 90 days, and those who never entered care were the transmission risk category and race/ethnicity (Kruskal-Wallis test, $p < 0.001$ and $p=0.02$ respectively).

There were 73 individuals who never entered care during the study period; of this total, five (6.8%) died and five (6.8%) moved away. When the two categories of persons entering care within 90 days and after 90 days were collapsed into one category and compared with a 'never entered' care category, the findings were similar — no statistical differences between categories except for transmission risk (chi square, $p = 0.042$).

The transmission risk category for 74 individuals is NIR/NRR. Almost half (46.9%) of those in the no risk identified or reported category are Black, 16.5% are Hispanic, and 7.1% are White non-Hispanic. A higher percentage (63.9%) of the NIR/NRR group was tested at a physician's office or outpatient clinic compared to a community test site. Six of the HIV positive individuals were infected through perinatal transmission. Four of the six children did not enter care until after 90 days and all six of the children had a country of birth outside of the United States.

Of the 449 individuals who entered care, CD4 lab values were recorded for 434 (96.7%). The median CD4 count was 395 cells/µL (IQR: 567–219). Of the 345 (76.8%) individuals who had an initial viral load lab recorded, the median viral load was 63,000 copies/mL (IQR: 316,228– 13,000). According to CDC's classification, a CD4 cell count of less than 200 cells/ µL is an AIDS diagnosis. In total, 104 individuals (24%) had CD4 counts less than 200 cells/ µL at their first medical visit, 82 (42%) had CD4 counts between 200 and 499 cells/ µL, and 148 (34.1%) had CD4 counts at or above 500 cells/ µL.

The predictor variables of sex, race/ethnicity, and transmission risk category were included in the multivariate Cox regression model; see Table 4.2. The prediction model was significant overall ($p = 0.004$). In the model a significant independent predictor for later entry into medical care was NIR/NRR [adjusted hazard ratio (AHR) = 0.62; 95% confidence interval (CI) = 0.43–0.88]. A marginally significant factor associated with earlier entry into medical care was the MSM and IDU transmission risk category [AHR = 1.27; 95% CI = 0.99–1.63]. Sex and race/ethnicity did not significantly influence time of entry into care.

When examining the year of diagnosis, the years 2006 and 2009 had the smallest percentages (62.8% and 62.6% respectively) of individuals who entered care within 90 days while the year 2010 had the highest percentage (17.1%) who had no evidence of entering care. I performed sensitivity analyses to assess the influence of diagnosis year on each of the co-variates in the final regression model and found no appreciable change in the size of effect of the hazard ratios.

Discussion

During the 5-year period of 2006–2010, 65.1% of newly diagnosed HIV-positive individuals in Utah, a low-incidence state, accessed medical care within 90 days from their positive HIV test, and an additional 14.9% of individuals entered care after 90 days, but before the end of the study. These time periods are based on CDC recommendations for individuals to enter care within 90 days from diagnosis.[1] Torian et al. examined new HIV cases in New York City, a high-incidence location, and, using a similar study design, found 63.7% had entered care within 90 days (3 months) and an additional 19.1% entered care after 90 days.[7] The median time to enter care in the study was 30 days, which is also similar to past research. Guenter et al. found a median time of 24 days in Arkansas [22] and Plitt et al. reported a median time of 29 days among Canadian Aboriginals in 2009. [6]

Almost half (47.3%) of the newly diagnosed individuals entered care within the first 30 days and an additional 17.8% entered care within 90 days. In my study, the first few months following a new diagnosis were the best opportunity to link individuals into care and once the 90 day 'window' elapsed, it appeared to be much harder for individuals to enter medical care. The first 90 days as the optimal time period for entry to care was also observed by Torian et al. in New York City.[7] Case management and active follow-up on referrals to medical care may help strengthen the linkages to care within the first 90 days.

For individuals with no identified risk (NIR) or no risk reported (NRR) for transmission, I found 38% lower adjusted odds of entry into medical care. This association has not been identified in other studies, but one reason may be that

transmission is often collapsed into broad categories — IDU compared to non-IDU or MSM compared to non-MSM. One reason for the delayed entry to medical care found in my study may be that public health programs and community organizations have resources specifically targeting high risk groups (MSM, IDUs) while there are relatively few programs for individuals with no identified risk factors. Another possibility is that newly diagnosed NIR/NRR individuals who have undisclosed risk behaviors may be hesitant to enter HIV medical care since these behaviors may then be revealed to their family or other social networks.

A history of injecting drug use (IDU), which included MSM and heterosexuals, approached significance ($p = 0.09$) as a predictor for earlier entry to medical care. An intriguing finding related to transmission risk category is that MSM who are also IDUs may be more likely to enter care early while heterosexual IDUs may be less likely to enter care; this is a cautious interpretation since the findings were not significant. One possible reason, similar to the one described above, is that in Utah there are HIV supportive services (case management, support groups, targeted outreach) specifically for IDUs who are also MSM so these newly diagnosed individuals have more services available. Another possibility is that of less stigma and more support in the Lesbian, Gay, Bisexual, Transgender (LGBT) community for newly diagnosed individuals.

In some studies, women have been shown to have greater disparities in accessing medical care than men.[23, 24] However, in our study and other studies using the state HARS databases,[4, 5, 7] there have been no significant differences found between women and men in time to enter medical care. One possible reason is that there are no differences in regards to sex in the population as a whole, but only among specific risk

groups of women. Another possibility is the relatively small number of women (14.8%) in our study and the inability to detect a difference in medical care access

As with the United States in general, in Utah minorities are disproportionately affected by HIV. In 2009, the percentage of new cases by race and ethnicity percentage was 60% White non-Hispanic; 24% Hispanic; 9% Black; and 7% other races. This compares with the racial composition of the overall population of 83% White non-Hispanic; 12% Hispanic; 1% Black; and 4% other races.[25] In Utah, there are two distinct HIV positive black populations: African-Americans are approximately 42% of cases and African-born (refugees and immigrants) are 58% of cases.[26] It is important for health care providers and public health workers to be aware of the differences between ethnic and racial group to design culturally-appropriate interventions to increase early entry to medical care.

Testing site of diagnosis has been identified as a predictor for initiation of care although the effect is not well understood. Diagnosis at a site co-located with primary medical care can hasten entry[7] while diagnosis as an inpatient in the hospital can delay entry,[5] seemingly contrary findings. A national sample found no difference between testing at a physician's office, a hospital, or in a nonhealth care setting.[4] I was interested in examining the effect of test site for my study population and based on the univariate analysis, site of HIV diagnosis was a good candidate for the multivariate model, but the large number of missing observations prevented site of diagnosis from inclusion.

Utah is a low-incidence HIV state and has averaged 112 of new cases a year (including con-current HIV and AIDS) from 2000 to 2010. Because of the low number of annual cases, it was necessary to combine multiple years (2006–2010) for a large

enough sample, especially for categories with low annual numbers such as women, IDU, and racial/ethnic minorities. One potential problem with using a 5-year period is that obstacles and enablers to medical care may change over this length of time. However when I assessed the influence of diagnosis year on choosing co-variates for the regression model or the measure of effect in the final regression model, I found no appreciable differences.

Limitations

This study has several limitations. The main variable of interest, time to entry to medical care, is calculated using the proxy measure of the date of first CD4 count or viral load lab report. Although this proxy measure has commonly been used by researchers as a reliable indicator of medical care since the labs are ordered by a medical provider, it has never been systematically assessed for reliability.[4-7]

Other studies have identified barriers to entering medical care that I was interested in examining but the information was not available or complete in the eHARS database such as insurance status,[4, 27] income,[4] previous relationship with a medical care provider,[28] HIV-related illnesses,[29] and education.[4, 5]

As with most studies, there is the concern of how generalizable my study findings are to HIV positive populations in other states in the United States. The potential factors making Utah's situation unique are the relative homogeneity of HIV positive individuals in regards to risk behaviors (55% are MSM), sex (85% are male), and race/ethnicity (64% are White non-Hispanic). Although this homogeneity can also be beneficial to studies since potential confounding is reduced and more subtle risk factors are detectable that may be indiscernible in more heterogeneous populations.

Conclusions

The majority of individuals newly diagnosed with HIV enter medical care within 90 days from their first positive test. However approximately 15% of HIV positive persons appear to have never entered care. Linkages into medical care need to continue to be improved. The no identified transmission risk was associated with delayed entry into care for individuals. Additional linkage to care programs that do not focus on high risk groups may need to be developed. Individuals with undisclosed risk may benefit from more extensive or additional post-HIV test counseling or case management to identify the perceived barriers to medical care. More research is needed on factors that promote entry to care, especially in regards to information that is not currently available in surveillance databases.

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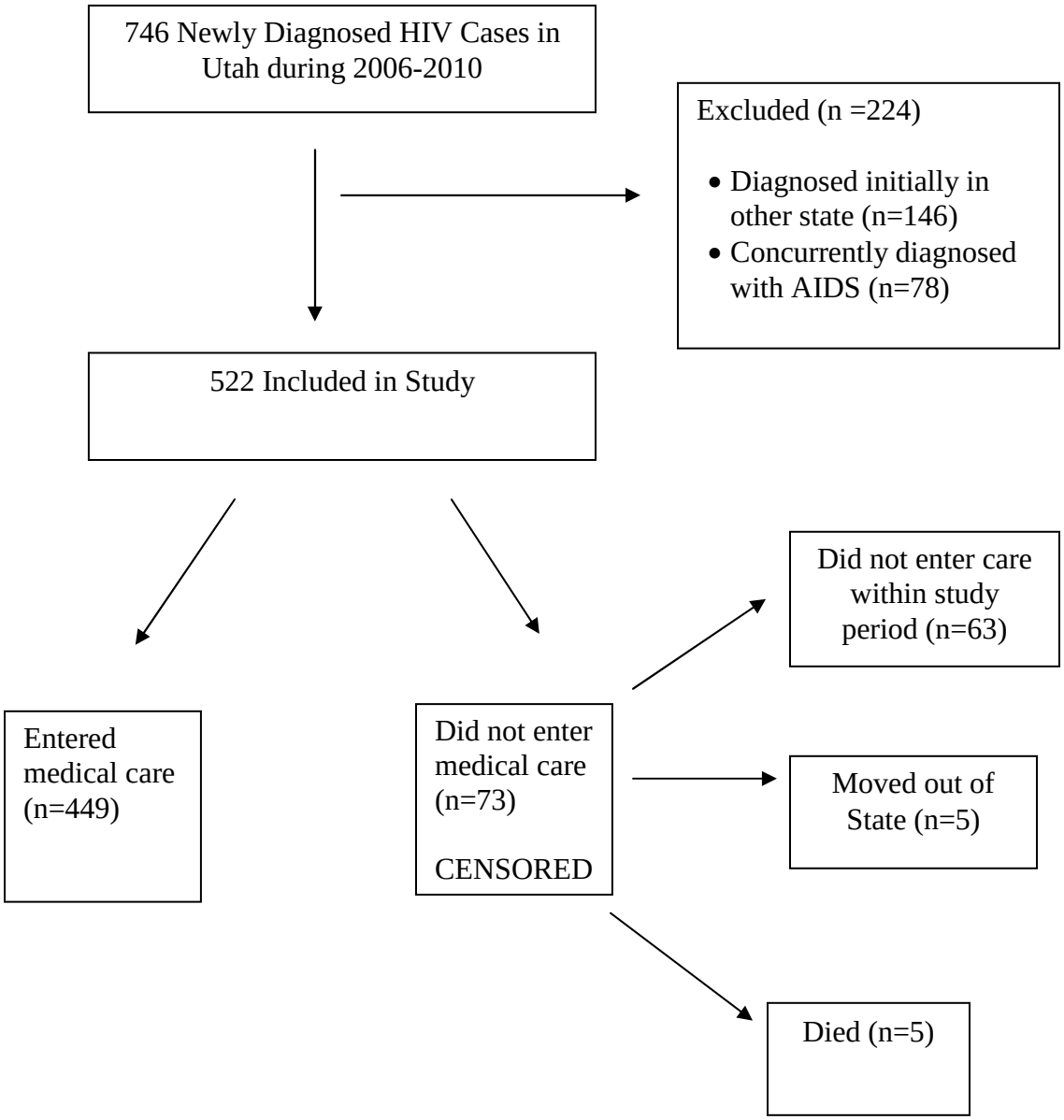

Figure 4.1
Participant Flow Chart for Individuals in the Study

Table 4.1

Time to First Medical Care Visit from Initial HIV Diagnosis by Selected Characteristics in Utah, 2006-2010 (522 Individuals)

Variable	First Visit within 90 Days of Diagnosis [a] n (%)	First Visit after 90 days of Diagnosis[a] n (%)	No Record of Any Visit [a] n (%)	Total [b] n (%)
Total	340 (65.1)	109 (20.9)	73 (14.0)	522 (100)
Sex				
Male	295 (66.3)	89 (20.0)	61 (13.7)	445 (85.3)
Female	45 (58.4)	20 (26.0)	12 (15.6)	77 (14.8)
Race/Ethnicity				
White non-Hispanic	231 (67.9)	68 (20.0)	41 (12.1)	340 (65.1)
Hispanic	73 (67.0)	19 (17.4)	17 (15.6)	109 (20.9)
Black	26 (53.1)	14 (28.6)	9 (18.4)	49 (9.4)
Other	10 (41.7)	8 (33.3)	6 (25.0)	24 (4.6)
Age Group				
0-12	2 (33.3)	4 (66.7)	0	6 (1.2)
13-19	6 (54.6)	3 (27.3)	2 (18.2)	11 (2.1)
20-29	105 (65.2)	38 (23.6)	18 (11.2)	161 (30.9)
30-39	93 (62.4)	32 (21.5)	24 (16.1)	149 (28.5)
40-49	79 (65.3)	19 (15.7)	23 (19.0)	121 (23.2)
50 and older	55 (74.3)	13 (17.6)	6 (8.1)	74 (14.2)
Transmission Risk				
Men who have sex with men (MSM)	195 (67.9)	54 (18.8)	38 (13.2)	287 (55.0)
Injecting Drug Use (IDU)	19 (61.3)	7 (22.6)	5 (16.1)	31 (5.9)
MSM and IDU	64 (71.9)	20 (22.5)	5 (5.6)	89 (17.1)
Heterosexual	26 (74.3)	6 (17.1)	3 (8.6)	35 (6.7)
Perinatal Exposure	2 (33.3)	4 (66.7)	0	6 (1.2)
No identified risk / no risk reported	34 (46.0)	18 (24.3)	22 (29.7)	74 (14.2)

Table 4.1 Continued

Variable	First Visit within 90 Days of Diagnosis [a] n (%)	First Visit after 90 days of Diagnosis[a] n (%)	No Record of Any Visit [a] n (%)	Total [b] n (%)
Total	340 (65.1)	109 (20.9)	73 (14.0)	522 (100)
Injecting Drug Use (IDU)				
History of IDU	83 (69.2)	27 (22.5)	10 (8.3)	120 (23.0)
No History of IDU	257 (63.9)	82 (20.4)	63 (15.7)	402 (77.0)
Site of HIV Diagnosis (n=315)				
Private Physician's Office and Outpatient Clinic	81 (65.3)	29 (23.4)	14 (11.3)	124 (39.4)
Community Test Site	109 (57.1)	45 (23.6)	37 (19.4)	191 (60.6)
Year				
2006	64 (62.8)	28 (27.5)	10 (9.8)	102 (19.5)
2007	64 (65.3)	19 (19.4)	15 (15.3)	98 (18.8)
2008	77 (65.8)	26 (22.2)	14 (12.0)	117 (22.4)
2009	77 (62.6)	26 (21.2)	20 (16.3)	123 (23.6)
2010	58 (70.7)	10 (12.2)	14 (17.1)	82 (15.7)
Lab Values at first visit				
Median viral load, copies/ ml	73,500	23,000	NA[c]	NA
Median CD4 count, cells/ µL	409	404	NA[c]	NA
CD4 (µL) <200 (n=434)	82 (78.9)	22 (12.0)	NA[c]	104 (24.0)
CD4 (µL) 200-499	132 (72.5)	50 (27.3)	NA[c]	182 (42)
CD4 (µL) > 499	112 (75.7)	36 (24.5)	NA[c]	148 (34.1)
Country of Birth				
United States	259 (67.5)	77 (20.1)	48 (12.5)	384 (73.6)
Foreign-born	81 (58.7)	32 (23.2)	25 (18.1)	138 (26.4)

[a] Data are shown as number (row percentage) of total row cases.

[b] Data are shown as number (column percentage) of the total 522 cases.

[c] These persons never entered care therefore no lab test is recorded for them

Table 4.2

Univariate and Multivariate Cox Proportional Hazards Analysis of Risk Factors for Delayed Entry into Medical Care after HIV Diagnosis in Utah, 2006-2010 (515 Individuals)

Variable	Hazard Ratio (95% CI)	Adjusted Hazard Ratio (95% CI)
Sex		
Male	1.0 (reference)	1.0 (reference)
Female	0.88 (0.68 – 1.14)	1.02 (0.70 – 1.52)
Race/Ethnicity		
White non-Hispanic	1.0 (reference)	1.0 (reference)
Hispanic	0.98 (0.78 – 1.24)	1.06 (0.83 – 1.34)
Black	0.80 (0.57 – 1.11)	0.94 (0.65 – 1.37)
Other	0.67 (0.41 – 1.07)	0.80 (0.49 – 1.30)
Age Group		
0-12	1.0	Not included in final model
13-19	0.68 (0.29 – 1.56)	
20-29	0.81 (0.40 – 1.63)	
30-39	0.86 (0.64 – 1.14)	
40-49	0.88 (0.65 – 1.18)	
50 and older	0.94 (0.69 – 1.29)	
Transmission Risk		
Men who have sex with men (MSM)	1.0 (reference)	1.0 (reference)
Injecting Drug Use (IDU)	0.83 (0.56 – 1.24)	0.82 (0.51 – 1.30)
MSM and IDU	1.26 (0.98 – 1.61)	1.27 (0.99 – 1.63)
Heterosexual	1.33 (0.92 – 1.92)	1.33 (0.81 – 2.19)
Perinatal Exposure	1.01 (0.45 – 2.28)	1.01 (0.43 – 2.39)
No identified risk / no risk reported	0.60 (0.44 – 0.80)	0.62 (0.43 – 0.88)
Injecting Drug Use (IDU)		
Evidence of IDU	1.21 (0.97 – 1.50)	Not included in final model
No evidence of IDU	1.0 (reference)	

Table 4.2 Continued

Variable	Hazard Ratio (95% CI)	Adjusted Hazard Ratio (95% CI)
Site of HIV Diagnosis		
Private Physician's Office and Outpatient Clinic log rank	1.0 (reference)	Not included in final model
Community or Public Test Site	0.81 (0.63 – 1.04)	
Year		
2006	1.0 (reference)	Not included in final model
2007	0.78 (0.57 – 1.07)	
2008	0.79 (0.57 – 1.09)	
2009	0.79 (0.58 – 1.07)	
2010	0.77 (0.57 – 1.05)	
Lab Values at first medical visit		
CD4 (µL) <200 (n=434)	1.0 (reference)	Not included in final model
CD4 (µL) 200-499	0.93 (0.73 – 1.19)	
CD4 (µL) > 499	0.85 (0.66 – 1.10)	
Country of Origin		
United States	1.0 (reference)	Not included in final model
Foreign-born	0.92 (0.74 – 1.14)	

CHAPTER 5

CONCLUSION

Each year 50,000 new individuals are infected with HIV in the United States.[1] The number of new cases has not decreased over the last 10 years despite significant resources being directed towards the disease. These three studies examined different points along the continuum of HIV disease: high-risk behaviors for HIV infection, HIV testing, and entry into medical care for HIV positive individuals.

High-Risk Behaviors for HIV Infection

In 2006, the Centers for Disease Control and Prevention released new HIV testing guidelines recommending that HIV testing be offered on a routine basis to patients in health care settings.[2] I compared men who have sex with men (MSM) with regular medical providers to MSM without regular medical providers to better understand the types of HIV-related risk behaviors of MSM in health care settings. In the study sample, I found that 47% of the MSM had high-risk behaviors and of those with high-risk behaviors, 58% had a regular medical care provider. Injecting drug users (IDUs) were less likely to have a regular provider (unadjusted Odds Ratio (OR) 0.44; 95% Confidence Interval (CI), 0.22 – 0.91) than individuals who were not IDUs.

I examined sexual risk in three ways: number of partners, type of sex partner, and anal sex with or without a condom. None of these definitions of sexual risk were

associated with having a regular medical care provider. These findings suggest MSM who access health care may engage in a wide range of HIV-risk behaviors and if a provider is uncomfortable asking about drug using and sexual behaviors, than the provider should test for HIV and not assume the patient is not at risk for HIV.

HIV Testing in Health Care Settings

Previous research has provided some evidence that having a medical provider will lead to increased HIV testing for MSM.[3, 4] Using the same sample of MSM from the previous study on high risk behaviors and access to a provider, I examined the influence of having a regular medical care provider on HIV testing during the past year. In this study, the percentage of MSM who had an HIV test in the last year was 53%. If a man disclosed his sexual orientation to his medical provider, he was more likely to have had an HIV test (adjusted OR 2.19; 95% CI, 1.56–3.07), but if the man did not disclose his sexual orientation, than having a provider was not significantly associated with testing (adjusted OR 1.14; 95% CI, 0.78–1.67). Interventions to improve communication between primary care providers and MSM may increase HIV screening in this population.

Entry to Medical Care

Approximately 20% of individuals aware of being HIV positive are not in medical care, which represent an opportunity lost for better health outcomes.[1] The Utah Department of Health (UDOH) collects information on HIV positive tests and HIV-related labs (CD4 cell counts and viral loads), which provides an opportunity to assess the time for newly diagnosed individuals to enter medical care. During the time period of

2006–2010, almost half (47.3%) of the newly diagnosed individuals entered care within the first 30 days and an additional 17.8% entered care within 90 days. In my analysis, delayed care was associated with no identified (NIR) risk category [Hazard Ratio (HR) = 0.62; 95% CI = 0.43–0.88] while a combined transmission risk category of men who have sex with men and inject drugs [HR= 1.27; 95% CI= 0.99–1.63] was marginally associated with earlier entry to care. Individuals with NIR may benefit from more extensive or additional post-HIV test counseling or case management to identify the perceived barriers to medical care.

Future Research

The role of medical care or medical care providers was an important aspect in each of the three studies, yet medical care information was lacking in the available data. More detailed information on medical care such as if disclosure of sexual orientation was initiated by the patient or provider or how often the patient saw the provider would help to better describe the problems and to develop interventions. The HIV/AIDS reporting system (HARS) database housed at the UDOH is an important HIV resource that contains unique identifiers for each newly diagnosed person. Researchers would benefit by working with state health departments to collect information for HARS that is available, but is currently not being gathered. Additional research is also needed to better identify what the barriers and obstacles are for people entering into medical care after being diagnosed with HIV.

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